National Water Center's Experimental Area Hydrologic Discussion (AHD)
Product Description Document
July 2022

Part I – Mission Connection

a. Product Description –

The National Water Center (NWC) has recognized the operational need for a near-term hydrologic product to highlight the potential of rapid-onset flooding to support the NWS flash flood watch and warning process. Rapid-onset flooding is defined as flooding that leads to significant impacts and develops over a short period of time, typically less than six hours. The experimental Area Hydrologic Discussion (AHD) is a combined text and graphical product, which highlights locations across the continental United States (CONUS) that may be impacted by rapid-onset flooding. Additional areas outside of CONUS may be added as the National Water Model (NWM) domain is expanded in the future. The AHD's expected lead time is 2 - 6 hours in advance of most flash, urban, and small stream flooding events; however, the duration will be based on event type, circumstance, and forecaster confidence.

The text will include a list of the threat (what), locations affected (where), and timing (when) in the header, applicable current conditions (e.g., Quantitative Precipitation Estimate (QPE), soil moisture, streamflow status), and a discussion on how antecedent conditions, combined with forecast rainfall, could potentially result in rapid-onset flooding. The graphic may include, but is not limited to the following: National Water Model (NWM) Short Range Forecast (SRF) 12-hour rapid-onset flooding and high water probabilities, high flow magnitude analysis, and/or past 7 or 14-day average high flow magnitude analysis. The text portion of this product will eventually transition to the AWIPS environment for creation, and be linked to a graphic hosted on an NWS website.

b. Purpose –

The AHD is a short-term discussion focusing on areas of potential rapid-onset flooding with aerial coverage dependent on the hydrologic condition to support the NWS Flash Flood watch and warning process. The AHD will speak to the hydrology by providing analysis of NWM short-range forecasts, other prediction tools output, and focusing on how antecedent conditions will influence the potential rapid onset flooding impacts based on forecast rainfall and rainfall rates. To ensure a high level of internal situational awareness, the Weather Prediction Center (WPC) and NWC will each coordinate and alert the other upon the issuance of their respective products (Mesoscale Precipitation Discussion (MPD) for WPC and AHD for NWC).

The AHD is an NWC product that supports Impact-Based Decision Support Services (IDSS) and NOAA's mission of saving lives and property.

c. Audience –

Information contained in the AHD is intended to be used by NWS field offices to aid in the flash flood watch and warning decision-making process, and by NWS core partners as part of IDSS. The experimental AHD will highlight the rapid-onset flooding for locations across CONUS. The AHD is publicly available at the links below.

d. Presentation Format –

The experimental AHD will feature a graphic and text combination to represent the potential developing flood related impacts can be accessed from the following landing page: https://www.weather.gov/owp/operations.

e. Feedback Method –

The NWC is always seeking to improve the availability and quality of its products and services based on user feedback. Comments regarding the experimental AHD should be provided by December 31, 2022, through the electronic survey via the link provided below:

https://www.surveymonkey.com/r/ExpAreaHydroDisc_2022

Comments may also be submitted to Paula Cognitore at paula.cognitore@noaa.gov.

Part II – Technical Description

a. Format and Science Basis –
This experimental AHD is intended to become part of an operational product suite from the NWC, which uses state-of-the-science for rapid-onset-flooding forecasts, along with additional analysis information, antecedent conditions, soil composition and terrain topography to augment the flash flood watch and warning process local, events across the United States.

b. Product Availability –
The AHDs will be issued only during times in which the atmospheric and current antecedent conditions would support potential hydrologic and flood related impacts with respect to flash, urban, or small stream flooding. AHDs will only be issued during the NWC's operational hours (routine hours of 5:00 AM - 8:30 PM Central Time). If the NWC has expanded operating hours for an event, then AHDs may also be issued outside routine operating hours. At the conclusion of this experimental period, input will be gathered and analyzed to improve the format and content. Upon completion of this work, the AHD will continue to follow the NWS 10-102 process to advance it as an Operational Product.

c. Additional Information - Sample copy of the experimental AHD

Experimental Area Hydrologic Discussion #138

Valid Times: Fri, 10 Jun 2022 12:32:32 UTC - Fri, 10 Jun 2022 21:32:32 UTC
Issuance Date/Time: Fri, 10 Jun 2022 12:32:32 UTC

NWC National Water Center

WHAT: Localized flash, urban, and small stream flooding
WHERE: West-central Mississippi
WHEN: Through early afternoon

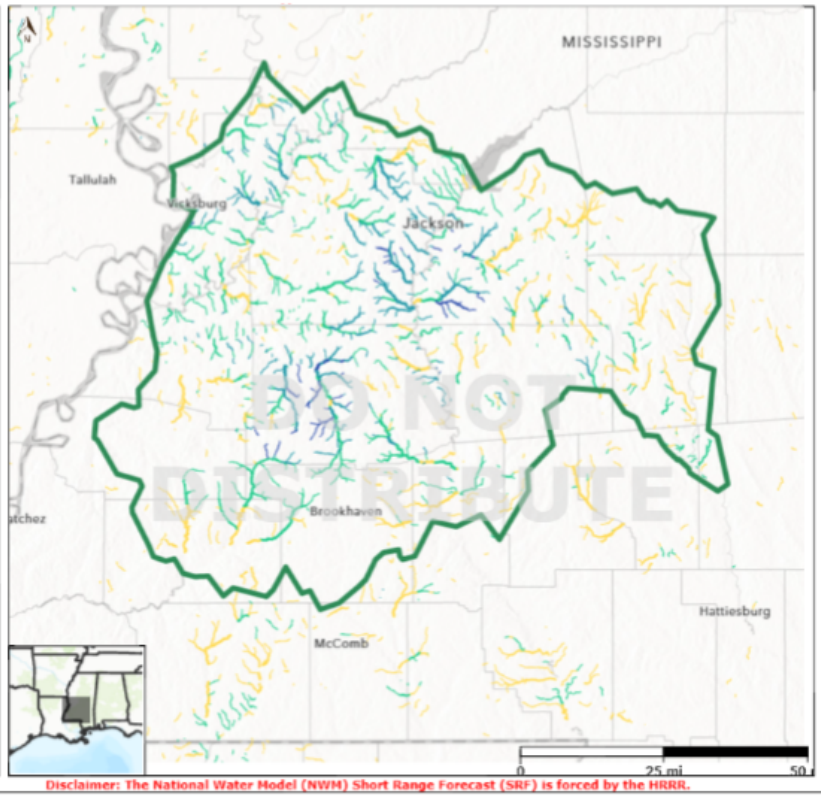
FORECAST RAINFALL AND ANTECEDENT CONDITIONS
QPF: 1 - 3"+ (HRRR)
Rainfall Rates: 1 - 2"+/hr (Gage)
Soils: 35 - 55% (0 - 10 cm RSM, NASA SPoRT)

DISCUSSION:
Ongoing convection is expected to impact west-central Mississippi by 16Z, potentially producing localized flash, urban, and small stream flooding. Antecedent soil conditions over the region are fairly dry, however this system has produced locally heavy rainfall in excess of 3" as it has progressed through OK and AR. Widespread hydrologic impacts are not expected; however, due to high rainfall rates, combined with local terrain, infiltration rates may be quickly exceeded, particularly in the Jackson metro area.

The NWM SRF is signaling moderate to strong probabilities of rapid onset flooding (> 50%) in the areas of concern. The SRF high flow probabilities through the region are generally around 50% AEP; however, there are isolated signals with AEP values below 10% AEP, suggesting locally significant hydrologic responses are possible on small streams.

//RLF

ATTN...WFO...JAN
ATTN...RFC...ORN...WPC



Area of Concern

Max Status - Forecast Trend
Maximum Flood Status
Record
Major
Moderate
Minor
Action
Forecast Trend
Increasing
Constant
Decreasing

Other Active AHDs

12-Hour - High Water Probability (%)
76% - 100%
51% - 75%
26% - 50%
< 25%

Disclaimer: The National Water Model (NWM) Short Range Forecast (SRF) is forced by the HRRR.